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ABSTRACT

This paper investigates, analyzes, synthesizes, and subsequently proposes some potential consequences of the interaction of industrial arts and postsecondary/adult education as set within the context of today's society. Part 1 first lists fourteen key societal influences, trends, and characteristics which provide a conceptual description of the context of the educational environment as a basis for the proposals to be made. It then presents an overview of the postsecondary arena's institutions, populations, programs, and objectives. Part 2 begins with a synthesis of industrial arts objectives. It then explores the possibilities of industrial arts in postsecondary/adult education. Suggestions include contributions of industrial arts to postsecondary/adult education program objective areas of (1) occupational/vocational/technical/pretechnical education, (2) recreational/leisure/cultural and avocational education, (3) basic education, and (4) transfer/liberal arts/college parallel education. (YLB)

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Industrial Arts in Postsecondary/Adult Education: An Initial Exploration of the Possibilities

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THE RATIONALE

Purpose

Major hallmarks of a true profession include the scrutiny to which it subjects its existing efforts and the intensity with which it scans the horizons for new avenues of service. Professions are indeed service oriented and it is with the intent of increasing the effectiveness of the industrial arts profession that the following was compiled. This paper seeks to investigate, analyze, synthesize, and subsequently propose some potential consequences of the interaction of industrial arts and post-secondary/adult education as set within the context of today's highly demanding society.

As such, this paper applies some key principles, as outlined by the Middle States' Commission on Higher Education,[1] by exploring:

1. The optimum relationships between the various institutions in the post-secondary/adult education realm, their objectives and the needs of their constituents.

2. The extent of our profession's concern with respect to the relationship between our objectives and our outcomes for all populations.

3. The relationships between post-secondary/adult education program objectives and those of general education . . . including education for the development of technological literacy.

4. The extent to which post-secondary/adult education programs and courses develop abilities to form independent judgement, cause students to weigh values, and to understand and apply basic theory--all within a technological context.

5. The effect of the post-secondary/adult education program spectrum in broadening each student beyond that which is needed for mere credentialing.

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[1] Paraphrased and adapted from a list of qualities and characteristics distinguishing superior educational institutions as found in the Commission on Higher Education's Characteristics of Excellence in Higher Education and Standards for Middle States Accreditation. Middle States Association of Colleges and Schools, 1978, p. 3.

6. The influence of students' post-secondary/adult education experiences in terms of constructive guidance of their educational, personal and career aspirations.

The focus of the paper will be to speculate on, and conceive of, some possibilities that could arise, . . . that could be of value, . . . and that seem to offer potential for further exploration. As such this document is not a cataloging of the shortcomings of the current educational system. Rather, as its title suggests, it seeks to offer some constructive challenges for the industrial arts profession to increase its service to society by becoming more actively involved in the post-secondary/adult education arena.

Beyond such altruistic aims of course, there are also some much more pragmatic ones. It would be foolhardy for the profession to ignore the imperatives of the current educationally troubled times. Specifically this exploration of industrial arts' post-secondary role is also due to a recognition of:

1. The contradiction between our profession's continued insistence on its function as an essential aspect of general education, i.e., education for all; and its apparent willingness to restrict itself, and/or to allow itself to be exclusively relegated to the K-12 portion of the educational endeavor. We know that there is more to education than just formal K-12 schooling!

2. The fact that many K-12 students do not have the chance to benefit from an exposure to industrial arts. In some cases school systems do not require and/or encourage such enrollment while others do not offer, or schedule in such a way as to permit participation in industrial arts. Some lack of exposure is also due to students not knowing they needed industrial arts; some do not come to value industrial arts until it is too late to study it in high school; some consider industrial arts courses too difficult, too stigmatizing, or otherwise unattractive; and others felt that they did not need them for the career objective that they were pursuing while in school.[2]

3. The need to establish the validity of our presence in arenas other than the traditional K-12. This will subsequently allow our programs to provide better service to all citizens--as per our objectives.

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[2]An adapted rationale paralleling one explaining why students did not take science and mathematics in high school. As found in the Office of Education's Pretechnical Post High School Programs, 1967, p. 9.

4. The necessity to correct existing erroneous impressions of what industrial arts is and how our profession seeks to achieve its objectives.[3]

5. The potential and/or existing impact of shrinking enrollments at the secondary school level.[4]

6. The increase of post-secondary and adult enrollments in evening and weekend programs, technical institutes, junior and community colleges, and adult and community schools.

7. The increasing need of the federal government to orchestrate a systematic and comprehensive post-secondary educational policy.[5]

8. The desirability to constructively guide the expanding control of higher education by governors, state legislatures, and bureaucrats.[6]

9. The imperatives of our society's need to project and conceive of comprehensive human resource delivery systems[7] capable of meeting the demands of our economic system.

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[3]Note that a recent National Center for Higher Education Management Systems publication, one with the objective of clarifying terminology at the post-secondary/adult education level, compressed industrial arts, trades, and technology education into one subject and then provided the following explanatory statement: "Mechanical work, a business, a livelihood, or occupation that requires special skills, especially of a manual or technical nature (p. 114)." A Handbook of Standard Terminology for Describing Adult Learning Opportunities. National Review Draft. Boulder, Colorado: National Center for Higher Education Management Systems, March 1978.

[4]Bushnell, David S. "Articulating Vocational Education at the Post-Secondary Level: A National Study." Technical Education News. March/April 1978, pp. 13-14; 24. a.

[5]According to Christoffel and Rice, Federal Policy Issues and Data Needs in Post-Secondary Education, the federal government must evolve its career education policy as well as its overall post-secondary education policy (pp. 5, 6, 7, 15). Final Report to the National Center for Education Statistics, NCES 75-222. Washington, D. C.: U. S. Government Printing Office, 1975.

[6]Ewald B. Nyquist. "Telling It Like It Is: Cooperation and Competition in Post-Secondary Occupational Programming." Presentation at the Ninth Annual Pennsylvania Conference on Post-Secondary Occupational Education, September, 1977. See Martorana, et al., 1978.

[7]Henry David in the National Institute of Education's A Plan for the Study of Vocational Education. National Institute of Education, 1977, p. 2.

10. The National Institute of Education study, and its implications for legislative change, of vocational education's patterns of resource allocations, target populations, enrollments, and achievements.[8]

11. The confusing aspects of the terminology associated with post-secondary/adult education. Due in part to the diverse set of providers and participants involved, the inconsistencies and impreciseness of terminology provides compelling justification for a descriptive exploration of the post-secondary arena.[9]

12. The necessity of organizing our profession's thoughts, aspirations, philosophy, commitment, and approach to its emerging role in post-secondary/adult education.

Potential Uses

Beyond the uses implied by the secondary education purposes, this exploration is designed to facilitate applications across the various levels (federal, state, and local) of educational policymaking and across the functional aspects of such efforts (research, dissemination, brokering, evaluation, development, planning).

Federal uses could include both the inventorying of funding programs and the coordination of data collection efforts. Subsequently this paper may prove to be of use in the analyses of adult population learner needs, participation patterns, and service thrusts. As implicit in most federal efforts, a further key application may be to the developmental process associated with relevant legislation and regulation.

Facilitation of program articulation efforts at the state level represents another reasonable application as does the data collection effort. This paper could be used to guide data acquisition programs to insure results that are compatible through the entire local-state-federal spectrum. Local guidance of

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[8] Ibid.

[9] As convincingly argued for by the National Center for Higher Education Management Systems in A Handbook of Standard Terminology for Describing Adult Learning Opportunities. National Review Draft. 1978, pp. ix-x.

internal management procedures may be facilitated by some sections of this paper. Additionally the format provided by an objective-population matrix may serve to assist local institutions in describing their programs to clients, constituents and lay boards.

THE CONTEXT OF THIS EXPLORATION

Post-secondary/adult education has experienced significant growth due to what Martorana, et al. (1978) call a "historic alliance of land grant colleges and universities and the local centers of vocational education (public schools, area schools, community colleges, and private technical institutes) across the land" (p. v). Even beyond mere proliferation of programs, post-secondary/adult education has functionally become closely entwined with such key national imperatives as research and development, manpower training and educational/occupational equity.[10] Undoubtedly this congruency between program evolution and national needs is an outgrowth of the societal context that houses them. Some key characteristics of this context are described in a report on pretechnical education:

> The impact of technological advances and the replacement of human labor by machines and automation require a larger and larger percentage of the Nation's work force to obtain education which prepares them for more technical employment. The demand for highly skilled technicians and similar specialized supportive employees increases each year; thousands of technician jobs go unfilled while thousands of unskilled or untrained workers seek employment. (Office of Education, 1967, p. 9)

Much to the credit of those involved with the burgeoning post-secondary/adult education field, attention has been placed on an increasing concern with the improvement of program quality.[11] Perhaps the broadest of such attentions is represented by the congressionally mandated National Institute of Education study of vocational education--in its largest sense. Therein Henry David writes:

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[10] As noted by Christoffel and Rice in Federal Policy Issues and Data Needs in Post-Secondary Education. 1975, pp. 3-4.

[11] See "Articulating Vocational Education at the Post-Secondary Level" in D. S. Bushnell (ed.). Help Wanted: Articulating Occupational Education at the Post-Secondary Level. Columbus, Ohio: National Center for Vocational Education, The Ohio State University, 1977.

> There are two needs. One is to contribute to a fuller and more reliable understanding of the effects of the federal role in vocational education. The second is to establish a better information base and analytical capabilities than now exist for making federal policy in the future. (National Institute of Education, 1977, p. 5)

Implications for the Future: Societal Influences and Educational Environment Characteristics

A review of the literature revealed considerable treatment of the general post-secondary/adult education arena as well as of its constituent fields. There is also an extensive body of literature associated with industrial arts. However, these two descriptors seemed to be almost mutually exclusive in nature--though obviously not due to any inherent incompatibility. As a consequence of the lack of extensive systematic treatment of industrial arts' role in post-secondary/adult education a compilation of some key societal influences, trends, and characteristics was necessitated in order to provide a conceptual description of the context of the educational environment as a basis for the proposals in this paper. No rank order is implied by the sequence nor is relative importance to be inferred by the lengths of the various statements.

1. There will be a gradual increase in the number of older people. Although somewhat dependent on fertility rates, estimates suggest the percentage of adults over 25 will approximate 57-67% by 2000. Then the median age will probably be 35 as compared to 28 in 1975. Also of particular relevance to our typical K-12 school focus is that the population sector under age 15 (28% in 1970) will decrease to

22% by the year 2000. Additionally, the white/nonwhite ratio is expected to change from 12% nonwhite in 1974 to 15%.[12]

2. In the final analysis, most of what one knows is obtained after leaving full-time public schooling (K-12).[13]
3. The psychological aspects of a person's worklife have been posited as the most important forces in one's life.[14]
4. Adult and post-secondary vocational education programs have expanded both in scope and in size. Enrollments have grown sixfold since 1947 with post-secondary technical education evidencing the most dramatic gains.[15] Also predicted is an increase in recurrent post-secondary education at all age levels.[16] The percentage of the population engaging in adult education has almost doubled (7.8% to 13.3% since 1957)[17] and the size obviously indicates potential for much more growth.

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[12]For a more detailed treatment of population trends and their implications see Stephens' 1978 Mississippi Valley Industrial Teacher Education Conference presentation entitled, "Population: What Are the Likely Implications for Industrial Education and Industrial Teacher Education?" Nyquist in Martorana, et al. (1978) also refers to similar trends.

[13]As concluded by Emerson in Ziel (1965). Education and Productive Society.

[14]Emerson citing Overstreet's pioneering work, in Ziel (1965).

[15]As reported by Bushnell, Cooperation in Vocational Education: An Executive Summary of the AACJC/AVA Joint Study. Washington, D. C.: American Association of Community and Junior Colleges, 1978, p. 3.

[16]Christoffel and Rice's observation in Federal Policy Issues and Data Needs in Post-Secondary Education. 1975, p. 6.

[17]From the National Center for Education Statistics' compilation, The Condition of Education: 1976. 1976, p. 18.

5. Due to both moral and legal (PL 94-482) motives,[18] there is an increasing emphasis on providing equal vocational programs opportunity. According to Herr, "nontraditional populations will continue to be mined heavily for students" (1978, p. 52) for these reasons as well as to keep up enrollments.

6. Change has become the hallmark of life in today's society, and it is particularly important to those engaged in the realm of technology. Emerson points out that a person entering worklife today must expect major changes during his lifetime, many involving retraining for new jobs and even more needing updating and upgrading to maintain their position.[19] In short, Emerson summarizes by forcibly stating that:

> Technological change exerts great pressure on vocational and technical education for the adaptation of training programs to meet rapidly changing conditions. It strikes at the root and fiber of all phases of occupational training and demands that vocational educators lift their sights to future needs as well as to those of the present. (Emerson, p. 176)

7. Public attitudes towards education indicate a valuing of technical and related curricula as evidenced by the 1978 Gallup Poll[20] on education. When asked as to which high school subject areas were most useful in later life, the respondents indicated the following rank (in order of decreasing usefulness):

    1. English (literature, composition, grammar)

---

[18] See for example section 101 of PL 94-482, The Education Amendments of 1976; Christoffel and Rice, 1975, p. 6; and the Council of North Central Community Junior Colleges Report, 1977, p. 2.

[19] See Emerson's chapter, "Post-Secondary Utilitarian Education" in Ziel (1965, p. 186).

[20] See the report on the Annual Gallup Poll on Education, Kappan, September 1978.

2. Mathematics
3. Commercial (typing, bookkeeping)
4. Extracurricular activities (sports, drama, band)
5. Shop (woodworking, drafting, machine trades)
6. History
7. Science
8. Foreign language
9. Psychology
10. Domestic science (sewing, cooking)

Furthermore, it is important to note that when asked as to the subjects they wish they had studied--but did not, the public listed in order of decreasing frequency:

1. Typing and other secretarial skills
2. Mathematics
3. Shop

8. Increased interest in restoring the importance of the liberal arts and "infusing them with a new vitality" is predicted by Nyquist. He suggests this as a reaction to what he describes as a:

> . . . streak of vocationalism that has hit our higher institutions, meaning their inordinate emphasis, in my view, on the cash benefits of college education in the pursuit of job credentials at the expense of liberal learning, has gotten so out of hand that they threaten to make a four-letter word out of the "higher" part of the term "higher education." That is, "higher" may now have to be spelled H-I-R-E. (Martorana, et al., 1978, p. 6)

9. There is some shift within the field of post-secondary/adult vocational education, from an emphasis on occupationally oriented knowledge and skills to recognition of the increased importance of complementary

and supplementary competencies needed to function effectively in today's society.[21] In Frank's (1978) Final Report, Terrell Bell, former U. S. Commissioner of Education, has been quoted as predicting that:

> Emphasis will be on problem-solving skills as well as vocational competencies. Vocational education will continue to be responsible for increasing cognitive skills so that workers are able to go beyond entry-level jobs. Emphasis will be placed on new curricula and on such techniques as individualized learning. Today, however, 15-20 million American adults lack the simple basic skills to sustain themselves and their families or to avail themselves of the opportunities and assistance their communities offer. We must provide these basic skills along with those that a changing technology requires. (1977)

One exploration of Bell's latter point, namely the development of technological literacy, may be found in Dyrenfurth (1978) and another in DeVore (1976).

10. Diversity of content, objectives, arrangement, and institutional affiliation will characterize future post-secondary/adult education as will the opportunity to pursue alternative paths to equivalent objectives and the incorporation of career education at the post-secondary level as a vital part of this total educational spectrum of opportunities. As early as 1965 Emerson cogently argued for such a system in the following:

> If we are to meet the occupational training needs of all the people, we must provide a considerable range of content offerings, at various ability levels, and at such places and under such conditions as will make it possible for them to obtain the needed instruction. (p. 175)
>
> . . .
>
> A comprehensive program of vocational and technical education to serve the needs of all persons at the present time will need to include program offerings on the high school level as well as in the post-secondary institutions, for many youth now terminate their full-time

---

[21] Frank in Competency Based Adult Vocational Education Project: Final Report, 1978.

schooling during or at the close of their high school years. But the long-term trend appears to be definitely toward the placing of higher proportions of the total vocational and technical program on the post-secondary level, and toward the ultimate utilization of the community college for the task. (in Ziel, 1965, p. 183)

11. Despite the calls for comprehensive delivery systems, Emerson noted that:

    We must recognize that most communities will not have available the resources required to meet the needs of all the people, and that in pre-employment programs for youth, compromises in occupational choices will need to be expected. (in Ziel, 1965, p. 187)

12. An increased planning effort is frequently called for by observers of the contemporary educational scene. Emerson (1965), Bushnell (1978a) and Carl Herr (1978) have all documented the necessities of such work. While vocational education has probably been planned more often than not, increasing attention to systematic incorporation of the varied sectors of the human resource delivery system is called for by law (PL 94-482) as is specific attention to the articulation and complementary functioning of secondary and post-secondary levels within this system.

13. Coordination and cooperation among all of the various providers of service is clearly an (if not the) imperative of the time. To succeed in the quest of providing a multi-tracked, high quality delivery system, coordinated planning and implementation efforts are required of federal, state, and local agencies, institutions and other program providers.[22]

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[22] Support may be drawn from both Emerson, p. 187, in Ziel 1965, and Christoffel and Rice, 1975. The latter also cite the Carnegie Commission's recommendation in The Open Door Colleges, for coordinated federal, state and local efforts to stimulate the expansion of occupational education in community colleges and make it responsive to changing manpower requirements (p. 15). The CNCCJC Report also calls for such coordination (p. 2).

In a compelling fashion, Nyquist, in addressing Pennsylvania's annual statewide conference on post-secondary occupational education, calls for "a new academic ethos of diversity and yet community" (in Martorana, 1978, p. 10). He continues by pointing out the need for making "a mesh of things" among area vocational schools, community colleges, proprietary schools, four-year colleges, universities, employers, and state government--a group similar to the one referred to by Frank (1978) in an equivalent plea.

Several factors, even beyond the requirements of PL 94-482, encourage such cooperation and coordination. For one, Nyquist (in Martorana, 1978) refers to an "increasing parity of esteem enjoyed by all educational agencies, especially in the eyes of objective, external agencies, such as legislatures, federal agencies, state education departments, and regional accrediting agencies" (p. 10). Secondly, Henry David, Director of the National Institute of Education's Study of Vocational Education, attests[23] to congressional influence in this direction by casting the purview of this federally mandated study over the Comprehensive Employment and Training Act (CETA), the Youth Employment Demonstration Projects Act (YEDPA), and vocationally relevant aspects of national policy impacting employment, poverty, the handicapped, social welfare and vocational rehabilitation. A third force for cooperation originates in the economic exigencies faced by many institutions

[23] In the National Institute of Education proposal entitled, A Plan for the Study of Vocational Education, 1977.

in the post-secondary/adult education arena. Bushnell (1978a) in reporting the principal finding of the Joint American Association of Community and Junior Colleges (AACJC) and the American Vocational Association (AVA) articulation study, claimed that:

> Expanded student options and greater cost effectiveness can be achieved when local institutions are able to successfully coordinate their vocational programs.
>
> . . .
>
> With increasing competition for the educational tax dollar and increasing political pressure from state legislatures and Congress, a number of local institutions are exploring alternative ways of cooperating and articulating their programs with other institutions in their service area. Where such efforts have been successful, the multiple resources of the community will be tapped. The ultimate beneficiaries are more likely to be both full- and part-time students who are free to choose among course offerings without experiencing bureaucratic roadblocks or losing academic credit. (p. 13)

The fourth impetus towards coordination originates in tendency towards increased regionalism, both intra- and extra-state. Nyquist points this out by saying, "it will become increasingly essential for all institutions in a geographic area to confer, to cooperate in the interests of economy, to plan together and to advise state authorities or to propose developments in their own areas." (in Martorana, 1978, p. 7)

14. Accountability will become the catalyst for increasing post-secondary/adult education activity (Nyquist, in Martorana, 1978, p. 6) due largely to the financial difficulties educational institutions are incurring in today's inflationary times and also to some concern that "educators are feathering their own nests at the expense of the taxpayer" (Bushnell, 1978a, p. 13). This increased emphasis on accountability is thought to portend more frequent academic reviews and fiscal

audits (Nyquist, p. 16; Herr, p. 52; both in Martorana, 1978), increased scrutiny of nontraditional and extension programs (Herr, 1978, p. 52), and a likelihood of restoring stricter curricula requirements for degrees (Nyquist, 1978, p. 6).

The focus of this increased accountability will be to include an attempt to:

> . . . ensure that standards, policies, and practices have not been subordinated to institutional self-interests in the competition for students, either in the declining high school populations or in the growing nontraditional populations . . .
>
> Three questions are being asked: One, are students getting a good education, their money's worth and their mind's worth; two, are things improving; three, is any money being wasted?
>
> This increasing auditing and review function will come from state, federal, and local governments, depending upon the institution, as well as accrediting agencies, legislative bodies, and consumer protection agencies. (Nyquist, in Martorana, 1978, p. 6)

THE POST-SECONDARY ARENA

An accurate depiction of the post-secondary arena is required as a base upon which to build the rationale for industrial arts' involvement in post-secondary/adult education. Necessary to the achievement of this objective is a descriptive treatment of the key post-secondary/adult education components: institutions offering programs at that level, the populations' partaking of such opportunities, the programs offered, and of course the objectives addressed. Both a review of the literature and targeted letter solicitation[24] for relevant literature was conducted. This effort resulted in the following descriptions.

Institutions in the Post-Secondary/Adult Education Arena

Operating in the post-secondary/adult education arena are more than 1,233 two-year institutions[25] as well as numerous national voluntary or private organizations, associations, group agencies, societies, councils, and commissions that in some way are concerned with adult education.[26]

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[24]Letters were sent to the National Advisory Council on Adult Education, the American Association of Community and Junior Colleges, Bureau of Higher and Continuing Education (OE, HEW), the Fund for Improvement of Post-Secondary Education (HEW), the Adult Education Association of the USA, the Association for Continuing Higher Education, the Education Commission of the States, the Association for Continuing Professional Education, the National Association of Trade and Technical Schools, the American Association of State Colleges and Universities, the Coalition of Adult Education Associations, the National Community Education Association, the National Association for Public Continuing and Adult Education, the National Council on Community Services and Continuing Education, the University and College Labor Education Association, the Council on Post-Secondary Accreditation, and the Clearinghouse for Adult Education and Lifelong Learning.

[25]1977 data from "Fact Sheet on Two-Year Colleges," AACJC, 1978.

[26]From A Guide for Using Clearinghouse ADELL, by the Clearinghouse for Adult Education and Lifelong Learning, undated.

Additionally, there are those institutions that are concerned with technical and technician training. These also vary widely in name and scope. A few are termed technical institutes and:

> . . . deal solely with technician training, some with curricula in a single field, others with programs in several different fields. On the other extreme is the community college which may offer technician training, skilled crafts training, office training, and other occupational curricula, in addition to "transfer programs" of general education. (Emerson in Ziel, 1965, p. 180)

Hence, it may be inferred that the institutional make-up of post-secondary/adult education is multi-faceted. The Council on Post-secondary Accreditation (COPA) in fact attributes the strength and excellence of post-secondary education to the "unique and diverse character of its many individual institutions" (COPA, 1978, p. 9). Undoubtedly the remarkable growth of this sector of the educational spectrum is due in no small measure to the permissiveness with which such institutions pursue individual directions and organizational patterns. The result, according to Emerson, has been the opening up of new opportunities for vocational and technical education, service to a wider range of students, provision of close service to almost all geographic areas, and the utilization of a wider tax base than local schools can draw upon.[27]

For the purposes of this paper, it may also prove useful to identify specifically the names and natures of the institutions referred to. Because time did not permit a comprehensive personal survey, this information was obtained primarily from two major associations involved in post-secondary/adult education. COPA, in describing the institutions for which it coordinates

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[27]Emerson, "Post-Secondary Utilitarian Education," in Ziel, 1965, p. 182.

accreditation on a national front, refers to them as follows:

> Institutions of post-secondary education, the recipients of accreditation, are even more diverse. They are graduate, baccalaureate, associate and non-degree in level; public, private non-profit, and proprietary in governance; academic, vocational, and professional in orientation; complex and single purpose in organization. In addition, social institutions that are not primarily educational in purpose (government, business and industry, labor unions, churches, voluntary associations) also sponsor post-secondary education in support of their primary purposes. (1978, pp. 2 and 3)

Even more specific was the analysis of the 19 member states of the North Central Association of Schools and Colleges. This analysis of existing roles, functions, and relationships among post-secondary educational units resulted in the identification of seven types of institutions that provide lower division and occupationally related post-secondary education. These institutions were area vocational schools, technical colleges, community junior colleges, junior colleges, university branches, community schools, and skill centers.[28]

Populations Served by Post-Secondary/Adult Education

The varied nature of post-secondary/adult education institutions suggests that the populations they serve are equally varied. This is indeed the case for both institutions and participants. Edwin Herr characterizes students[29] taking advantage of post-secondary education opportunities as follows:

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[28] From the CNCCJC report, Roles, Functions, and Relationships of Area Vocational Schools, Technical Institutions, Community/Junior Colleges and Other Elements of Post-Secondary Education. 1977.

[29] Edwin Herr provides a succinct synthesis of post-secondary/adult education student characteristic research in "Advice to Students on Programs and Placement in Post-Secondary Occupational Education." Chapter in Programming Post-Secondary Occupational Education. Edited by Martorana, et al., 1978.

> The specific population differs whether we are talking about a community college or a proprietary school or a particular geographic location. But as the rhetoric and practice of access, equal opportunity, open admissions, and other such notions have become implemented in America, post-secondary occupational education has opened wide the doors to the factory worker, the handicapped, the high school dropout, the prison inmate, the youngster from the ghetto with learning difficulties, the uncertain, the apprehensive, the second careerist, the college flunk-out, the aged. Some of these persons will be full-time students; others will be part-time. Some will be deliberate in their goal-seeking; others will have no idea of the directions they might pursue. Many of these persons will be in community colleges. Many others will be in proprietary schools. (1978, p. 59)

Additionally, veterans, minorities, women, senior citizens, union members, and students without the typically accepted academic credentials[30] frequently take advantage of the opportunities provided by post-secondary/adult education. The following statistical highlights will serve to illuminate the varied nature and the foreseeable trends that typify post-secondary/adult education populations:

1. "A survey from the National Center for Education Statistics indicates that a total of over 27 million people participated in adult education programs during the course of a year as of May 1975. Over half (52%) of these adults were participating in non-credit courses. Of the remaining group which was enrolled for credit courses, only 25% were actually working towards a degree." (Students in Two-Year Colleges, AACJC, 1978)

2. "A total of 11,487,967 students were enrolled in all types of post-secondary institutions in the Fall of 1977. . . . Over 1/3 of those students (36%) were enrolled in two-year colleges." (Enrollment in Two-Year Colleges, AACJC, 1978)

3. In 1977 fall enrollments indicated 4,309,984 students, both full- and part-time, pursuing courses for credit. This amounts to 36% of the USA's undergraduate enrollment." (Fact Sheet on Two-Year Colleges, AACJC, 1978)

4. In 1976-77 nearly 3 million people participated in community education. (Enrollment in Two-Year Colleges, AACJC, 1978)

5. "Seventy-five percent of the students delaying college entrance at least five years after high school graduation enroll in two-year rather than four-year colleges." (Students in Two-Year Colleges, AACJC, 1978)

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[30] For a detailed description of such students refer to the Office of Education's Pretechnical Post High School Programs, 1967, p. 10.

6. Over half (53%) of all first-time enrollees in post-secondary education were enrolled in two-year colleges. (Fact Sheet on Two Year Colleges, AACJC, 1978)

7. Census Bureau data show that in 1976, 62% of students were over 21. (Fact Sheet on Two-Year Colleges, AACJC, 1978)

8. In Fall 1977, enrollment data show that "for all colleges, 93% of the increase in enrollment over the previous year was attributed to growth in enrollment of women." (Students in Two-Year Colleges, AACJC, 1978)

9. Women constitute 51% of the total two-year institution full-time student head count and 52% of the part-time count. (Fact Sheet on Two-Year Colleges, AACJC, 1978)

10. Minority student enrollment is estimated 15-20% of full-time enrollment by the Office for Civil Rights. (Fact Sheet on Two-Year Colleges, AACJC, 1978)

11. "The number of black students enrolled both full-time and part-time in all post-secondary institutions has doubled." (Students in Two-Year Colleges, AACJC, 1978)

12. "Enrollment projections from the National Center for Education Statistics indicate that between 1975 and 1985 enrollment at two-year institutions will increase by 48% while enrollment at four-year colleges is projected to increase by 4% in the same 10-year period." (Enrollment in Two-Year Colleges, AACJC, 1978)

13. The AACJC predicts that, "Although the number of people in the traditional college-going age range of 18-24 will decline by 1980, community and junior colleges are expected to continue their growth by serving increased proportions of women, minorities and older students through expended community education offerings. Enrollment by those 35 years of age and older in two-year colleges has already increased 30% from 1974 to 1976." (Enrollment in Two-Year Colleges, AACJC, 1978)

Post-Secondary Programs

Programmatically, post-secondary/adult education represents an educational equivalent to the Tower of Babel. Adult education, recurrent education, career education, cooperative education, higher education, lifelong learning, adult vocational education, adult basic education, extension education, technical

education, occupational education, human resource development, continuing education, and community education are all terms abstracted from the relevant literature. An AACJC fact sheet[31] refers to the National Center for Education Statistics' estimate that there are over 1,300 different occupational programs alone. Post-secondary/adult education programs include, independent of content base, those culminating in associate degrees, those targeting on short-term certificates and diplomas, many non-credit activities, and some volunteer service programs. Overall non-credit registrations increased 46.4%, from 1967-1968 to 1975-1976, and almost half (47%) of the increase occurred at public two-year colleges.[32] Occupational programs now approximate 50% of two-year enrollment, a 37% rise from the 13% represented by such programs in 1965.[33]

This program complex is a direct result of the interaction of a variety of institutions with the diverse needs of many sub-populations in a total spectrum of educational and societal contexts. Beyond such obvious causes, some of the proliferation of programs also seems attributable to the lack of a coherent federal policy on post-secondary/adult education. Christoffel and Rice (1975) document this in the following excerpt:

> The Compilation of Federal Programs Financing Post-Secondary Education, An Update, Fall 1974 . . . lists over 400 programs.[34] Approximately 25 separate Cabinet-level departments and agencies, from the Department of Agriculture to the Veterans Administration, administer them. Interestingly, the Department of Health, Education and Welfare provides less than half and the Office of Education less than a quarter of the total Federal dollars received by post-secondary institutions and students.

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[31] "Fact Sheet on Two-Year Colleges," AACJC, 1978.

[32] "Enrollment in Two-Year Colleges," AACJC, 1978.

[33] "Types of Programs in Two-Year Colleges," AACJC, 1978.

[34] Christoffel and Rice also document the variety of program purposes and funding mechanisms in Appendices A and B respectively of their report, Federal Policy Issues and Data Needs in Post-Secondary Education.

The following table, compiled for the National Commission on the Financing of Post-Secondary Education, illustrates sources, amounts, and percents of Federal post-secondary support.

Selected Post-Secondary Education Outlays by Major Participating Agencies: Fiscal Year 1972[35]

Agency	Amount (in millions)	Percent of total
Department of Health, Education & Welfare . . .	$4,090.4	44.3
Veterans Administration	2,006.5	21.7
Department of Defense	1,082.6	11.7
Department of Labor	898.2	9.7
National Science Foundation	390.2	4.2
All other agencies	769.0	8.3
TOTAL	$9,236.9	100.0

NOTES: Data supplied by the individual agencies. Percents do not add to 100.0 because of rounding.

In preparing their Handbook of Standard Terminology for Describing Adult Learning Opportunities, the National Center for Higher Education Management Systems (NCHEMS) most aptly summarized the reasons for post-secondary/adult education's particular difficulty with terms and programs. They stated that:

> The history of "adult education" has not followed a singular pattern. Rather, developments in "adult education," as in other education areas, have occurred spontaneously and frequently without planning or coordination. Many different constituencies, including those who sponsor and provide services for adult learners and segments of the adult learner population itself, have coined terms to distinguish their activities from one another. The development and implementation of Federal and State education laws and regulations, institutional policies and practices have used a variety of terms to represent their activities. Furthermore, developments have occurred unevenly both within and among the Federal, State, and local/institutional programs directed toward adult learners. One result is that numerous terms are currently used to represent such programs and the terms themselves are not interchangeable given the constraints of Federal, State and local/institutional policies and practices. (1978, p. 5)

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[35] National Commission on the Financing of Post-Secondary Education, Financing Post-Secondary Education in the United States. Washington, D. C.: Government Printing Office, December 1973, p. 107.

Perhaps the most useful endeavor, in the light of this tremendous diversity, would be to evolve a definitive taxonometric structure for post-secondary/adult education programs.[36] To do so however would transcend this author's competence and patience. Rather, using a broad brush approach, two equivalent organizational schemes will be portrayed and used to achieve the purpose of this paper. The first represents a categorization used by the AACJC in their Fact Sheet entitled Types of Programs Offered in Two-Year Colleges (1978). They identify three major program thrusts:

1. Vocational/Technical/Occupational programs which "are designed to lead directly to employment in a specific established or emerging field."

2. Transfer/Liberal Arts/College parallel programs which "are designed for students who plan to continue their post-secondary education at a four-year college or university."

3. Community education and special interest programs which are offered for those students or community members interested in civic, cultural, or recreational courses not carrying academic credit toward a degree, diploma, or certificate. Specific programs are also designed for such groups as women returning to schools, labor union members, senior citizens, and those seeking job upgrading skills. Developmental and remedial programs . . . are also offered. . . . Community education services include: cultural events, upgrading job skills, family life planning, adult basic education, health care services, and special programs for women and minorities.

The second model was developed by NCHEMS as part of their Handbook of Standard Terminology for Describing Adult Learning Opportunities provided in Figure 2. This model provides a representation of both the situation of adult learning (i.e., all post-secondary/adult education) within the context of lifelong learning as well as the characteristics of the varieties of such

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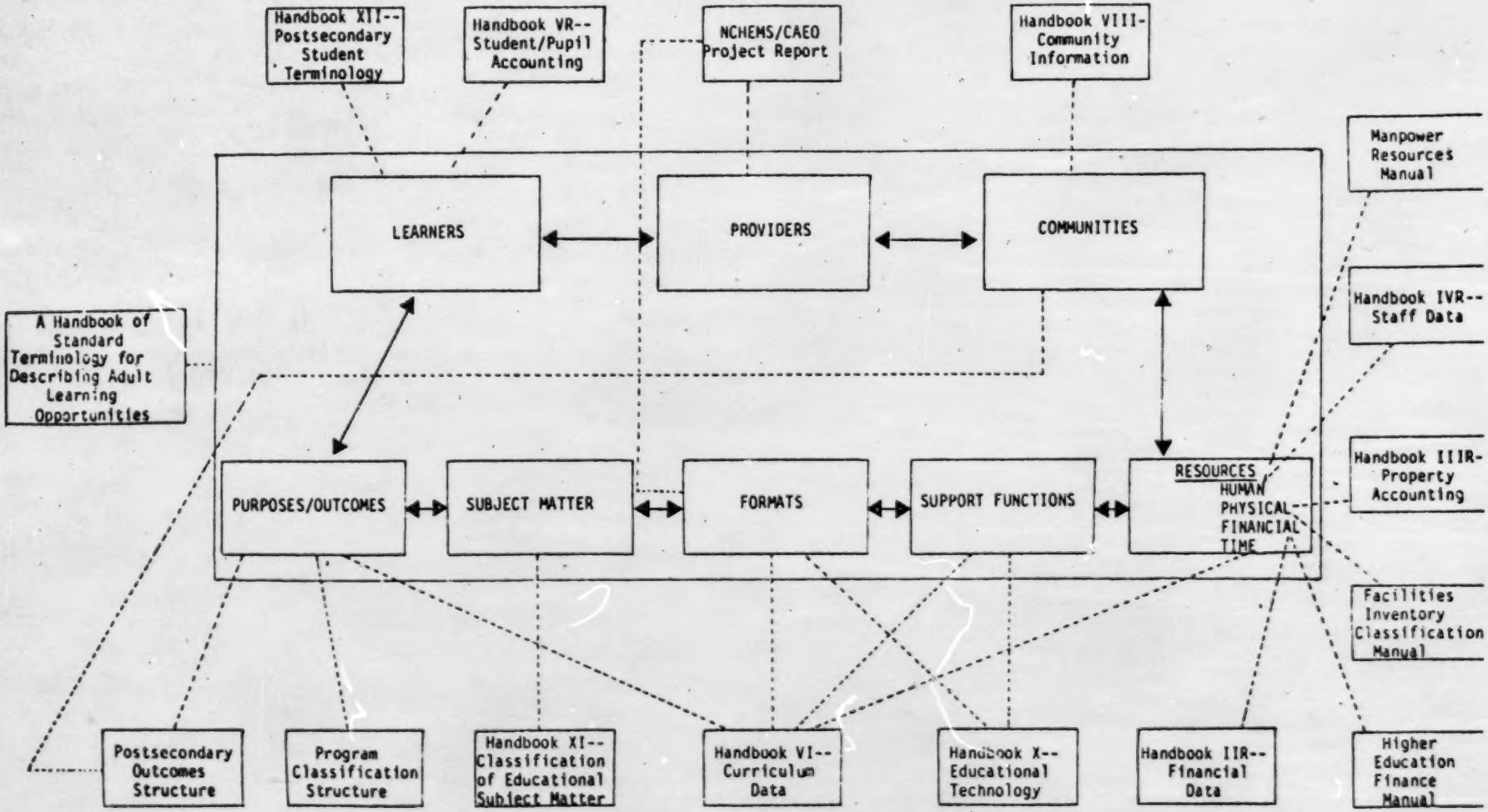
[36]The start of such a definitive treatment, and one that serious researchers would be well advised to review before beginning any programmatic endeavors in post-secondary/adult education, is presented by NCHEMS in their Handbook of Standard Terminology for Describing Adult Learning Opportunities, 1978. Of particular relevance is the review and synthesis provided by their rationale and conceptual modes as provided on pages 4-28. Figure 1 illustrates the relationships of the aforementioned Handbook to selected terminology references as currently used.

Figure 1

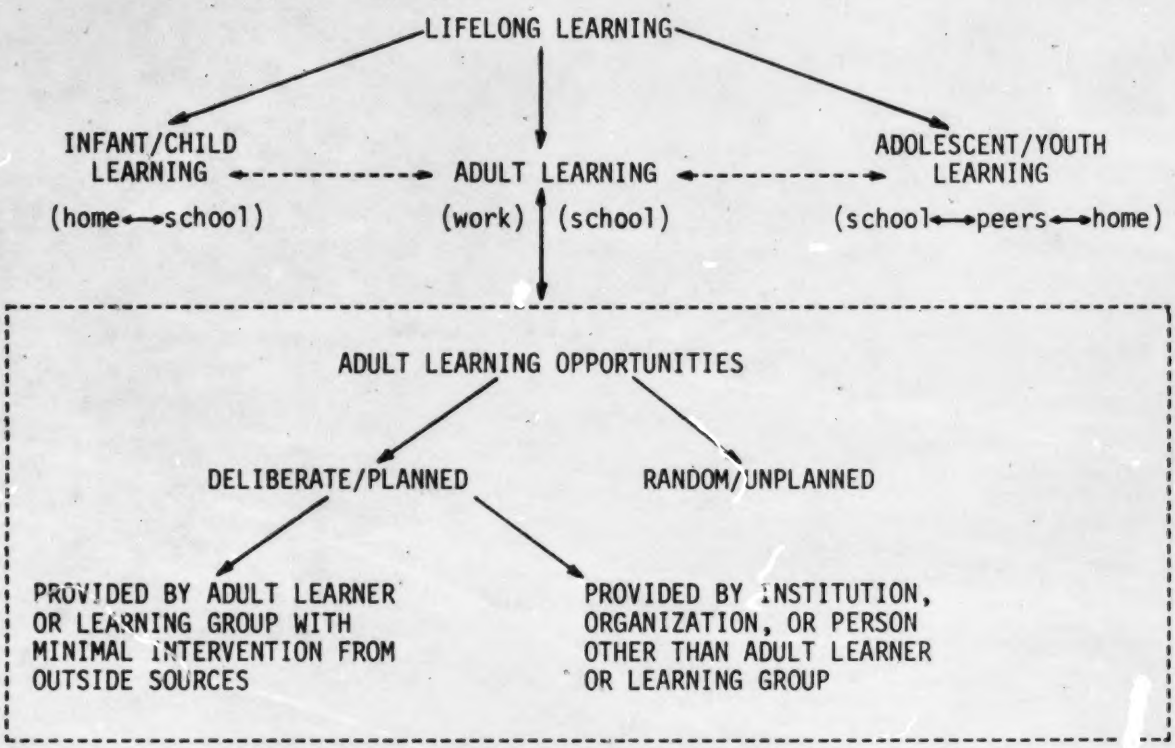
The Relationships of A Handbook of Standard Terminology for Describing Adult Learning Opportunities to Selected Government Terminology References



NCHEMS, 1978

Figure 2

A Representation of the Domain of Adult Learning Opportunities*

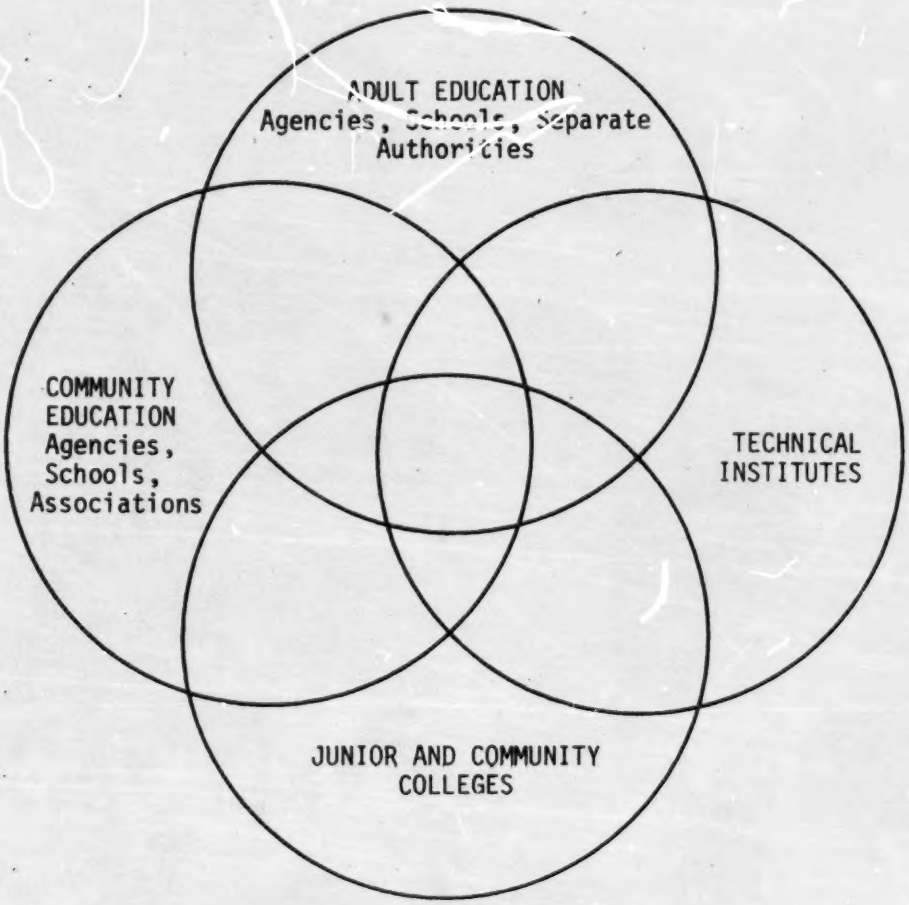


*Model from NCHEMS, Handbook of Standard Terminology for Describing Adult Learning Opportunities, 1978.

opportunities. To further delineate those programs provided by institutions, organizations, or other persons, this author developed a supplementary model provided in Figure 3 which depicts the institutions/agencies involved in supplying post-secondary/adult education. The efforts of this group of organizations, as they provide deliberate and planned programs, will be the focus of the remaining portions of this paper.

Figure 3

Model of Organizations Providing Deliberate, Planned Post-Secondary/Adult Education Programs



Post-Secondary/Adult Education Objectives

One of the most difficult portions of this paper was the attempt to abstract, synthesize and evolve a set of objectives for post-secondary/adult education. With considerable effort a rudimentary list was compiled but a caution noted by NCHEMS, while engaged in a similar effort, must be reiterated. The Center states that "it should not be assumed that purposes automatically result in outcomes or that the same purposes and outcomes relate to the same to all participants in a learning opportunity" (1978, p. 39). Furthermore it must also be recognized that unplanned outcomes and/or purposes may result from or be ascribed to any given programs. Also of direct importance is the possibility that societal and institutional objectives may be achieved concurrently with the achievement of individual objectives.

Using the broad brush approach of mission statements, a task force of the North Central Association of Schools and Colleges[37] attempted to categorize missions (i.e., purposes, roles, and desired outcomes) by institutions. Provided in Figure 4, this matrix clearly demonstrates a "tendency of the institutions to converge with respect to accepted roles and functions (1977, p. 1)." The task force goes on to infer that "all seven identified post-secondary units intend to increase the comprehensiveness of their role and function over the identified mission areas" (p. 1). Convergence of goals and functions, they observe, may be more a response to perceived community needs than to institutionally planned development. Some concern was also expressed about this trend,

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[37] See The Council of North Central Community Junior Colleges, Roles, Functions and Relationships of Area Vocational Schools, Technical Institutes, Community Junior Colleges and Other Elements of Post-Secondary Education. Hillsboro, Missouri: Jefferson College Press, 1977.

particularly when the institutions are "in direct competition for scarce resources or for a limited student clientele" (pages 1 and 2).

Figure 4

Council of North Central Community Junior Colleges
Matrix of Primary and Secondary Missions of
Post-Secondary Institutions by Area

Type Institution	Degree Granting						
	Vocational	Technical	Lower Div. College	Adult Cont.	Educ. ABE	Develop-mental	Career Counseling
Area Vocational School	X	(X)	E	X	(X)	X	X
Technical Colleges	(X)	X	(X)	X	(X)	X	X
Community Junior Colleges	X	X	X	X	(X)	X	X
Junior Colleges	0	0	X	(X)	(X)	X	(X)
University Branches	0	E	X	X	E	X	X
Community Schools	0	0	0	X	X	0	0
Skill Centers	X	0	0	X	X	0	X

X - Primary Mission
(X) - Secondary Mission
E - Emerging Mission
0 - None

The NCHEMS Handbook of Standard Terminology for Describing Adult Learning Opportunities provides a categorization of learner purposes and outcomes that is somewhat more program oriented than the aforementioned CNCCJC matrix. Furthermore, beyond the subject and/or program classification they provide, it is also useful

to note their analysis of learner motivation/reasons for pursuing post-secondary/adult education opportunities. The latter[38] include: obtaining advanced credit, completion of an unfinished endeavor, development of learning skills/learner assistance, and gaining of learner access and/or qualifying for program entrance. To maximize the organizational value of the NCHEMS categories of program objectives,[39] an additional step was taken. This involved subjective assignment of each separate NCHEMS specific post-secondary/adult education objective to the appropriate major categories as follows:

1. General Education Objectives
    a. Improving general knowledge and skills
    b. Developing abilities to deal with interpersonal and social relationships
    c. Gaining self-esteem and expressing values and aspirations
    d. Coping with reality
    e. Completing a course or program and thereby developing self-confidence and satisfaction
    f. Receiving psychological and emotional support from counseling, both academic and vocational
2. Occupational Education
    a. Preparing for, advancing in, or changing occupations
    b. Earning credits, degrees, licenses, certificates, credentials or other academic and non-academic awards
    c. Gaining access to opportunities
3. Family Education
    a. Preparing for and adjusting to family responsibilities and relationships
    b. Seeking and obtaining affiliations, acceptance, and stimulation

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[38]See the NCHEMS Handbook of Standard Terminology for Describing Adult Learning Opportunities section on classification of terms about the purposes and outcomes of adult education, 1978, p. 39.

[39]From NCHEMS Handbook of Standard Terminology for Describing Adult Learning Opportunities rationale section, 1978, pages 10-11.

4. Citizenship Education

   a. Becoming more active and aware citizens within the community

5. Recreation and Leisure Education

   a. Pursing recreational and leisure interests

   b. Gaining self-esteem and expressing values and aspirations

   c. Seeking and obtaining affiliations, acceptance, and stimulation

Frank's model[40] of functional competencies suggests five general knowledge fields of consumer economics, occupational knowledge, health, community resources and government and law as potential categories of adult education objectives. Within these his project focused on "four primary skills that seem to account for most adult competency requirements":

1. Communications skills (reading, writing, speaking, listening)
2. Computation skills
3. Problem-solving skills
4. Interpersonal relations skills

The career education component of post-secondary/adult education typically involves the phases of preparation/retraining and orientation/decision-making. The set of goals and objectives pertinent to the former will be treated separately in the technical/occupational/vocational education portion of this section. However, the orientation/decision-making aspect, i.e., the more guidance oriented objectives will be discussed here. Edwin Herr, in his chapter entitled "Advice to Students on Programs and Placement in Post-Secondary Occupational Education,"[41] classifies these into three categories, each dealing with the knowledges, skills

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[40] Derived from Frank's Competency Based Adult Vocational Education Project Report, 1978.

[41] In Martorana et al., Programming Post-Secondary Occupational Education, 1978.

and attitudes relevant to: (1) self, (2) occupational and other environmental opportunities, and (3) decision-making or career planning processes. Of particular import would be to note the themes or objectives implied by the latter category. Herr lists (p. 68) the following as typical examples:

1. Developing a vocabulary of self, educational or occupational alternatives using exploratory resources
2. Relating interest and capacities
3. Identifying personal strengths, which one wants to exploit in formulating an occupational preference
4. Understanding the interdependence of the educational and occupational structures
5. Differentiating interests and values
6. Considering implications of present-future relationships
7. Accepting oneself
8. Learning to organize time and energy to get work done
9. Learning to defer gratification, to set priorities
10. Acquiring knowledge of life in organizations and in bureaucracies
11. Learning about different role relationships (employer-employee, supervisory-supervisor relationships, relationships with coworkers)
12. Planning for specific goals
13. Considering contingency plans
14. Learning ways of accessing occupational or career opportunities
15. Understanding study skills and test-taking behavior in relation to their counterparts in work procedures and expectations

Technical/occupational/vocational education is recognized as consisting of both preparatory, job entry programs as well as pretechnical, qualification programs. In essence these two categories correspond to the two major purposes of vocational education as specified in the Education Amendments of 1976 (PL 94-482). According to the National Association of Trade and Technical

Schools' Standards for Accreditation, the chief educational objectives of such programs is "to train suitable persons for entrance upon (sic) or advancement in one or more occupations requiring manual, manipulative, or technical competence or skill (1976, p. 1)."

Purely technical programs are somewhat different in their orientation than traditional vocational or trade training curricula. In referring to the former, the Office of Education[42] characterizes them as follows:

> Technician education programs are devoted to producing highly specialized workers capable of performing many special, skilled tasks. They have almost reached the professional level in education, attitude, and competence. Such programs require rigorous study of scientific principles and supporting mathematics plus intensive laboratory-oriented instruction. Since the objective of this type of program is to prepare the student for gainful employment as a technician, the program should provide opportunities for him to acquire (1) the knowledge of applied scientific principles and their application to the hardware, processes, procedures, services, techniques, and materials in modern measuring and control devices, and (2) the ability to communicate with the professional engineer or scientist and to act as his delegate and assistant. (page 3)

Summary

To achieve the objectives for Part I of this paper, it was necessary to obtain operational closure with respect to the diversity of post-secondary/adult education. Consequently the preceding sections were synthesized to yield manageable albeit tentative operational overviews of the arena's institutions, populations, programs, and objectives. Briefly these overviews are:

I. Institutions/Organizations/Agencies

1. Technical institutes

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[42] Pretechnical Post High School Programs, 1967.

2. Vocational schools
3. Adult schools
4. Community schools
5. Community/junior colleges

II. Populations

1. Traditional
   a. adults
   b. students
2. Nontraditional
   a. minority groups
   b. women
   c. veterans
   d. senior citizens
   e. high school dropouts
   f. college dropouts
   g. second careerists
   h. prison inmates
   i. disadvantaged
   j. handicapped
   k. factory/union workers

III. Programs

1. Only deliberate planned programs provided by institutions, organizations or persons other than the adult learner or learning group were considered.
2. Program categories are:
   a. occupational/vocational/technical/pretechnical

b. transfer/liberal arts/college parallel

c. recreational/leisure/cultural

d. family education

e. citizenship education

f. basic education

IV. Objectives

1. Occupational/Vocational/Technical/Pretechnical

a. preparing for, advancing in, or changing occupations

b. earning credits, degrees, licenses, certificates, credentials or other academic and nonacademic awards

c. gaining access to opportunities

d. career decision-making/orientation/exploration

2. Transfer/Liberal Arts/College Parallel

a. improving general knowledge and skills

b. developing abilities to deal with interpersonal and social relationships

c. coping with reality

d. completing a course or program and thereby developing self-confidence and satisfaction

e. receiving psychological and emotional support from counseling, both academic and vocational

f. gaining self-esteem and expressing values and aspirations

3. Recreational/Leisure/Cultural

a. gaining self-esteem and expressing values and aspirations

b. pursuing recreational and leisure interests

c. seeking and obtaining affiliations, acceptance and stimulation

4. Family education
    a. seeking and obtaining affiliations, acceptance and stimulation
    b. preparing for and adjusting to family responsibilities and relationships
5. Citizenship education
    a. becoming more active and aware citizens within the community
6. Basic education
    a. developing communications skills
    b. computation skills
    c. problem-solving skills
    d. interpersonal skills

As presented, these overviews form the framework around which the analysis of post-secondary/adult education was conducted. The reader is encouraged to envision the institutional, program and objective overviews as forming the X axis of a matrix. The population overview forms the Y axis of the same matrix.

Part II of this paper will present a synthesis of the industrial arts profession's objectives and subsequently it will explore the possibilities of industrial arts in post-secondary/adult education. The matrix referred to will be illustrated so as to guide the exploration and to serve as a summary of Part I.

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AUTHOR'S STATEMENT

The previous Journal contains statements of rationale and context for this initial exploration of the roles of industrial arts in the post-secondary/adult education arena. Part I also presented an overview of the post-secondary arena's institutions, populations, programs and objectives. Part II now will present a synthesis of industrial arts objectives and then explore the possibilities of industrial arts in post-secondary/adult education.

THE OBJECTIVES OF INDUSTRIAL ARTS

Those in the industrial arts profession know that there have been many efforts at delineating its objectives. Many perspectives ranging from purely historical to entirely futuristic ones have been used to frame such endeavors. Perhaps more in a cynical vein than in a facetious one, some observers have even characterized such efforts as "closed loop like" repetitive dialogues that resolve little. Yet, it is this author's contention that each such investigation leads the profession closer to a clear understanding of its evolving purpose.

A synthesis of all such investigations is clearly beyond the scope of this paper. Rather, a compilation of three of the most recent and perhaps important documents[43] will be used to represent current thinking of the industrial arts profession. Since each of these documents in fact also represents syntheses of other studies, ideas, and positions, a representative overview is assured.

What is Industrial Arts?

Using a historical perspective to answer this question, Froelich points out by citing Bonser, that industrial arts consists of studies that pertain to "those occupations by which changes are made in the forms of materials to increase their values for human usage . . . and of the problems of life related

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[43]These documents include the American Industrial Arts Association's nationally distributed guide entitled: Industrial Arts: A Means of Preparing Youth to Understand and Contribute to our Industrial-Technological Society, January 1976; "What Are the Essential Learnings that Should be Derived from an Industrial Arts Program?" by Donald Froelich; and "What Are the Objectives of 'Industrial Arts' as Perceived by MVITEC Members, Public School Teachers, Public School Industrial Arts Teachers, Students, and the Lay Public?" by D. Thomas Ryerson; presentations at the 65th Mississippi Valley Industrial Teacher Education Conference, 1978.

to those changes" (Bonser, 1923). Froelich further elaborates on this by selecting Wilber's subsequent definition of industrial arts as being "those phases of general education which deal with technology--its evolution, utilization, and significance; with industry--its organization, materials, occupations, processes, and products; and with the problems and benefits resulting from the technological and industrial nature of society" (Maley citing Wilber).[44]

More recently, in a document used to brief the nation's congressional representatives as to industrial arts' potential, the American Industrial Arts Association (AIAA) described industrial arts as:[45]

1. a program of instructional and laboratory experiences which provide . . .
2. basic education for all students . . .
3. related to the industrial and technological aspects of life and offers opportunities to gain . . .
4. insights into production, recreation and consumerism through . . .
5. real and simulated experiences with . . .
6. tools, materials, and processes which will equip students to make . . .
7. wiser and more valid educational, career, and lifestyle choices.

Then, with respect to solidifying the general education rationale, the AIAA points out that:

1. because the American culture is distinctly technological, and
2. because the primary purpose of education in any society is to acquaint students with the nature of culture and their role in it,
3. then industrial arts, because of its primacy, becomes basic education in American schools.

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[44]American Vocational Association, A Guide to Improving Instruction in Industrial Arts, Washington, D. C.: AVA, 1968.

[45]Industrial Arts: A Means of Preparing Youth to Understand and Contribute to Our Industrial-Technological Society. American Industrial Arts Association, 1976.

Nor are such objectives merely the optimistic aspirations of the industrial arts profession. The following excerpts from PL 94-482 and its enabling regulations provide evidence that both Congress and the regulatory agency (USOE) concur with our profession's position.

1. Definition:

"(q) 'Industrial arts education programs' means those education programs (1) which pertain to the body of related subject matter, or related courses, organized for the development of understanding about the technical, consumer, occupational, recreational, organizational, managerial, social, historical, and cultural aspects of industry and technology including learning experiences involving activities such as experimenting, designing, constructing, evaluating, and using tools, machines, materials, and processes which provide opportunities for creativity and problem-solving and assisting individuals in the making of informed and meaningful occupational choices . . ."

2. Objective of Instruction:

Instruction shall be designed to:

"(i) Assist individuals in the making of informed and meaningful occupational choices. In order to accomplish or facilitate this purpose, such programs shall:

"(a) Provide occupational information and instruction pertaining to a broad range of occupations, including training requisites, working conditions, salaries or wages, and other relevant information;

"(b) Provide exploratory experiences in shops, laboratories, and observations in business or industry to acquaint students with jobs in the occupations included in this purpose;

"(c) Provide guidance and counseling for students enrolled in the industrial arts program under Sec. 102.4(b) (5) of this part to assist them in making informed and meaningful choices in selected occupational fields; . . . or

"(ii) Prepare individuals for enrollment in advanced or highly skilled vocational and technical education programs. In order to accomplish or facilitate this purpose, such programs shall:

"(a) Provide individuals with occupational information and exploratory experience for enrollment in such programs;

"(b) Provide occupational information and exploratory experiences directly related to current practices in industry . . . "

With considerable professional pride, the two major national professional associations, the AIAA and the AVA[46] identified the unique contributions of industrial arts as providing students an opportunity to:

1. develop an insight and understanding of industry, its place in our society, and the free enterprise system;
2. discover and develop individual talents, aptitudes, interests, and potentials as related to industry and technology, and applied science;
3. develop an understanding of industrial processes and the practical application of scientific principles;
4. develop basic skills in the proper use of common industrial tools, materials, and processes;
5. develop problem-solving and creative abilities involving the materials, processes, and products of industry;
6. develop an understanding of industrial and technological career opportunities and their requirements and develop those traits which will help students obtain and maintain employment.

The objectives of industrial arts truly represent a remarkable convergence of thought, particularly when one notes that over 3,000 teacher educators, 65,000 teachers, and an estimated 6-7 million students are engaged in this discipline nationwide. Table 1 illustrates the congruency by its incorporation of: Ryerson's (1978) synthesis of the previous studies by Schmidt and Pelley (1966) and Polk (1978) both in themselves syntheses of prior work; Froelich's (1978) citation of Wilber's and Pendered's (1967) list of important objectives of industrial arts as specifically related to general education; and the AIAA's most recent compilation of such objectives. The synthesis of these three perspectives will be used to form the Z axis of the matrix, provided in Figure 5,

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[46] In the American Vocational Association document, A Guide to Improving Instruction in Industrial Arts, 1968.

depicting the possibilities of industrial arts in the post-secondary/adult education realm.

Table 1

Comparative Listing of Industrial Arts Objectives

	Ryerson's Compilation	Wilber and Pendered's Compilation	AIAA's Compilation
1.	To develop consumer knowledge and appreciation and use of industrial products.	To increase consumer knowledges, to a point where students can select, buy, use, and maintain the products of industry intelligently	Develop attitudes, individual involvement, and a realistic evaluation for consumer awareness.
2.	To develop in each student a measure of skill in the use of common tools and machines.	To develop safe working practices. To develop a degree of skill in a number of basic industrial processes.	Develop basic skill in the use of tools and equipment. Develop safety habits.
3.	To develop worthy leisure time interests.	To develop recreational and avocational activities of a constructional nature.	Contribute to improved recreation.
4.	To discover and to develop creative technical talents in students.		
5.	To provide pre-vocational experiences of an intensified nature for those students interested in technical work.		
6.	To provide general all-around technical knowledge and skills.		Promote technical literacy in youth and adults.
7.	To provide vocational training for students who would not otherwise have this opportunity.		
8.	To explore potential occupations.	To provide information about, and insofar as possible, experiences in, the basic processes of many industries in order that students may be more competent to choose a future vocation.	Provide opportunities to identify aptitudes, abilities, and interests meaningful to career selection.
9.	To develop an understanding of our technical culture.	To explore industry and American industrial and technological civilization in terms of its evolution, organization, raw materials, processes and operations, products, and occupations.	
10.	To develop problem-solving skills related to materials and purposes.	To develop critical thinking as related to the materials, tools, and processes of industry and to encourage creative expression in terms of industrial materials.	Develop techniques in problem solving.
11.		To develop desirable social relationships, such as cooperation, tolerance, leadership and fellowship and tact.	Provide opportunities for personal & social growth.
12.		To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in artifacts from the material cultures of the past.	
13.			Provide opportunities for reinforcement of learning in other subject areas.

THE POSSIBILITIES

With the preceding documentation and analysis, the essential features of post-secondary and adult education have been characterized. Also outlined were some generally accepted aspects of industrial arts. In order to address the purpose of this paper, it now remains to explore the interactions between what post-secondary/adult education seeks to do and what industrial arts can do. To this end, a model that presents the possible combinations of interactions was evolved as shown in Table 2. From this it may be seen that one way to explore the possibilities of industrial arts in the post-secondary/adult education domain is to systematically determine if there is a reasonable likelihood that any specific industrial arts objective (or group of objectives) can serve one or more post-secondary/adult education thrusts for one or more of the target populations. Alternatively, one may wish to explore the opportunities of another matrix of industrial arts objectives versus agencies offering post-secondary/adult education. In a similar fashion each of the ten combinations provided in Table 2 may be explored to determine how industrial arts may contribute in the post-secondary/adult education arena. For the purposes of this paper, the set of descriptors of post-secondary/adult education agencies will be ignored in favor of post-secondary/adult education program objectives. In essence, for the purposes of this exploration it is more important to consider what post-secondary/adult education is attempting to do than to see who is offering such programs. Additionally, by assigning specific post-secondary/adult education objectives to the various categories of educational thrusts, the overall set of five descriptors

is reduced to a more manageable and graphically depictable three dimensions. Figure 5 illustrates the matrix used to guide subsequent considerations of what could be.

Application of the matrix analysis technique yielded the results shown in Table 3. Classifications were made, according to this author's judgements as to the degree to which industrial arts objectives had potential in assisting post-secondary/adult education in achieving its objectives. For this preliminary analysis, no consideration of population was made. This set of judgements which incidentally should be replicated with a representative panel of experts, suggests that industrial arts would be in a good position to contribute, in order of decreasing amount, to the post-secondary/adult education program objective areas of: occupational/vocational/technical/pretechnical education; recreational/leisure/cultural and avocational education; basic education; and transfer/liberal arts/college parallel education.

Industrial Arts and Post-Secondary/Adult Occupational Education

Essentially industrial arts has the capability of playing a major role in post-secondary/adult occupational education programs. Since many adults are in fact going through stages of career orientation, exploration and decision-making, industrial arts can provide adults much of the same assistance as it does to youth. Why could post-secondary/adult education institutions not establish exploration and orientation laboratories for each of the three most relevant clusters: energy and power, materials and processes, and communication? Certainly industrial arts facilities could be used to promote the comprehensive technological literacy of all enrolled in post-secondary/adult education relatively narrow

technician and trade training curricula. Would not such populations be well served by an exposure/awareness experience that would locate their particular occupation within the overall technological context?

Table 2

Possible Combinations of Descriptors[47] that Represent Interactions (Matrices) to be Investigated when Seeking to Determine Potential Roles for Industrial Arts in the Post-Secondary/Adult Education Arena

	Axes				
Matrix 1	PS/AE populations	x	PS/AE program objectives	x	IA objectives
Matrix 2	PS/AE agencies	x	IA objectives	x	PS/AE program objectives
Matrix 3	PS/AE agencies	x	PS/AE populations	x	PS/AE program objectives
Matrix 4	PS/AE agencies	x	IA objectives	x	PS/AE populations
Matrix 5	PS/AE agencies	x	PS/AE populations	x	Educational thrusts
Matrix 6	PS/AE populations	x	PS/AE program objectives	x	Educational thrusts
Matrix 7	Educational thrusts	x	PS/AE program objectives	x	PS/AE agencies
Matrix 8	Educational thrusts	x	PS/AE program objectives	x	IA objectives
Matrix 9	Educational thrusts	x	IA objectives	x	PS/AE populations
Matrix 10	IA objectives	x	PS/AE agencies	x	Educational thrusts

Legend:

PS/AE . . . . . Post-secondary/adult education
IA . . . . . Industrial arts

[47]Further elaboration as to the details of the various descriptors are provided on the next page as a continuation of Table 2, in the summary portion of Part I of this paper's Post-Secondary/Adult Education Review and in Table 1.

Table 2--Continued

Explanatory Details of the Characteristics Subsumed by Each Descriptor

Post-Secondary/Adult Education Agencies

Associations/organizations
Technical institutes/colleges
Junior/community colleges/university branches
Vocational schools/skill centers
Community schools
Adult schools

Post-Secondary/Adult Education Populations

Traditional
- Post high school continuing students
- Adults

Nontraditional
- Factory workers/union members
- Handicapped
- Prison inmates
- Disadvantaged
- Second careerists
- College dropouts
- High school dropouts
- Senior citizens
- Veterans
- Women
- Minority groups

Post-Secondary/Adult Education Thrusts

Adult education
Technical education
Community/junior college
Community education

Post-Secondary/Adult Education Program Objectives

Occupational/vocational/technical
Transfer/liberal arts/college parallel
Community education (non-credit)
- Recreational/leisure/cultural
- Family
- Civic
- Basic education

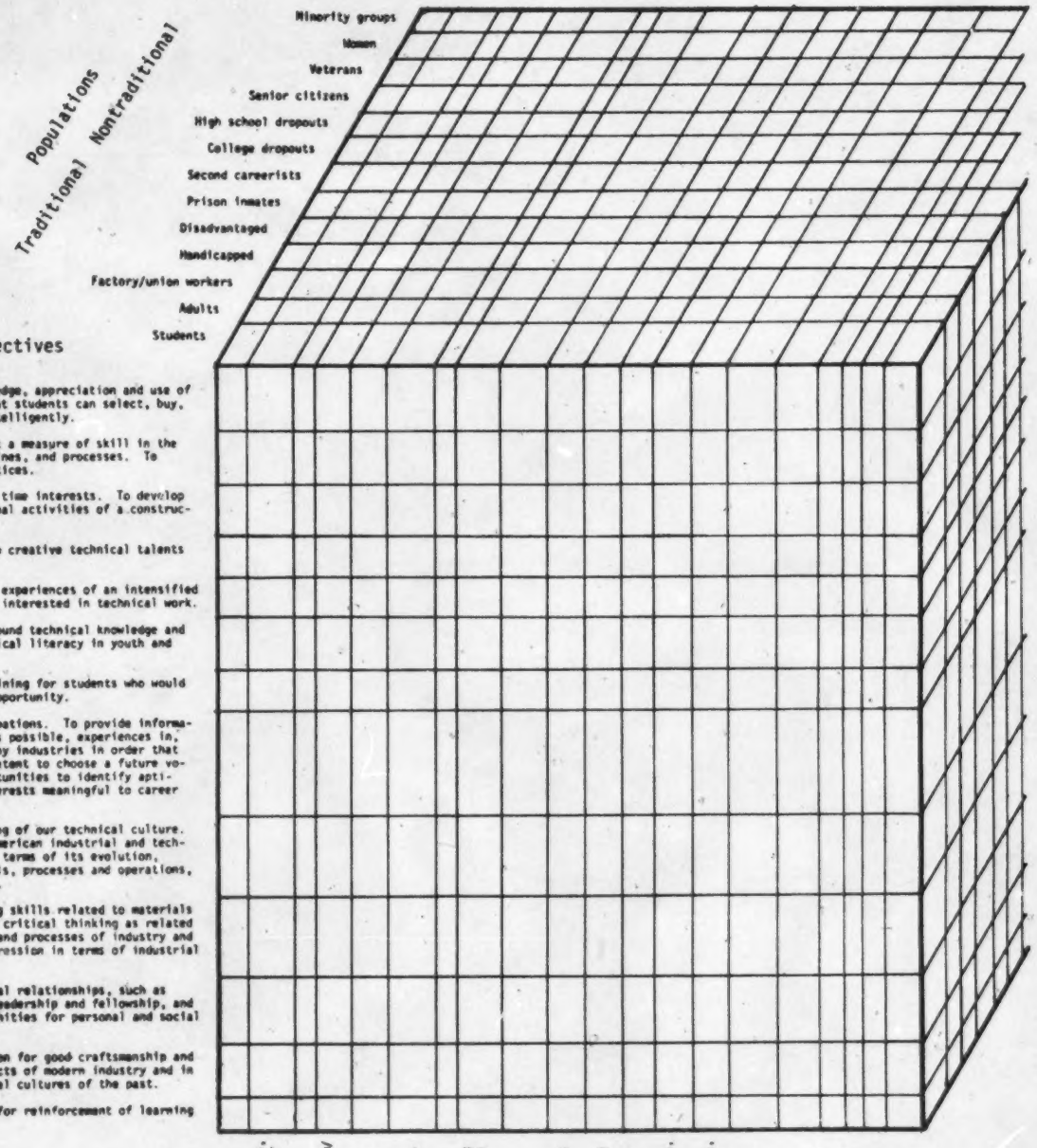
Special interest

Industrial Arts Objectives

Details provided in Table 1

Figure 5

Matrix Depicting the Possibilities of Industrial Arts In the Post-Secondary/Adult Education Realm



Industrial Arts Objectives

1. To develop consumer knowledge, appreciation and use of industrial products so that students can select, buy, use and maintain these intelligently.
2. To develop in each student a measure of skill in the use of common tools, machines, and processes. To develop safe working practices.
3. To develop worthy leisure time interests. To develop recreational and avocational activities of a constructional nature.
4. To discover and to develop creative technical talents in students.
5. To provide pre-vocational experiences of an intensified nature for those students interested in technical work.
6. To provide general all-around technical knowledge and skills. To promote technical literacy in youth and adults.
7. To provide vocational training for students who would not otherwise have this opportunity.
8. To explore potential occupations. To provide information about, and insofar as possible, experiences in, the basic processes of many industries in order that students may be more competent to choose a future vocation. To provide opportunities to identify aptitudes, abilities, and interests meaningful to career selection.
9. To develop an understanding of our technical culture. To explore industry and American industrial and technological civilization in terms of its evolution, organization, raw materials, processes and operations, products, and occupations.
10. To develop problem solving skills related to materials and purposes. To develop critical thinking as related to the materials, tools, and processes of industry and to encourage creative expression in terms of industrial materials.
11. To develop desirable social relationships, such as cooperation, tolerance, leadership and fellowship, and tact. To provide opportunities for personal and social growth.
12. To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in artifacts from the material cultures of the past.
13. To provide opportunities for reinforcement of learning in other subject areas.

a. Preparing for, advancing in, or changing occupations
b. Earning credits, degrees, licenses, certificates, credentials or other academic and nonacademic awards
c. Gaining access to opportunities
d. Career decision making/orientation/exploration
1
Occupational/Vocational/Technical/Pre-technical Objectives
a. Improving general knowledge and skills
b. Developing abilities to deal with interpersonal and social relationships
c. Coping with reality
d. Completing a course or program and thereby developing self-confidence and satisfaction
e. Receiving psychological and emotional support from counseling, both academic and vocational
f. Gaining self-esteem and expressing values and aspirations
2
Transfer/Liberal Arts/College/Parallel Objectives
a. Gaining self-esteem and expressing values and aspirations
b. Pursuing recreational and leisure interests
c. Seeking and obtaining affiliations, acceptance and stimulation
3
Recreational/Leisure/Cultural Objectives
a. Seeking and obtaining affiliations, acceptance and stimulation
b. Preparing for and adjusting to family responsibilities and relationships
4
Family Education Objectives
a. Becoming more active and aware citizens within the community
5
Citizenship Education Objectives
a. Developing communications skills
b. Computation skills
c. Problem solving skills
d. Interpersonal skills
6
Basic Education Objectives
Technical Institutes
Vocational Schools
Adult Education — Community Education
Community/Junior College

Table 3

Tentative Assignment of Degree[48] of Contribution that Industrial Arts Objectives may have to Achievement of Post-Secondary/Adult Education Objectives

INDUSTRIAL ARTS OBJECTIVES	PS/AE Objective Group						Σ_s	Σ_m	Σ_{m+25}	Rank of IA objectives' relevance to PS/AE
*	1	2	3	4	5	6				
1	W	W	M	M	S	S	2	2	6	2.5
2	S	W	S	W	W	M	2	1	5	6
3	S	W	S	W	W	W	2	-	4	9
4	S	M	S	W	W	W	2	1	5	6
5	S	W	W	W	W	W	1	-	2	12.5
6	S	M	S	W	W	W	2	1	5	6
7	S	W	W	W	W	W	1	-	2	12.5
8	S	M	W	W	W	W	1	1	3	10.5
9	M	S	M	W	M	W	1	3	5	6
10	S	M	M	M	W	S	2	3	7	1
11	W	W	M	S	W	S	2	1	5	6
12	S	W	M	W	W	W	1	1	3	10.5
13	S	S	W	W	W	S	3	-	6	2.5
Σ_s	10	2	4	1	1	4				
Σ_m	1	4	5	2	1	1				
Σ_{m+25}	21	8	13	4	3	9				
Rank of possible contribution by IA to PS/AE program objectives	1	4	2	5	6	3				

*Note that these numbers refer to the identification numbers used on the preceding Figure 5. Hence the post-secondary/adult education objective group #1 represents occupational/vocational/technical/pre-technical objectives, etc. . . . and industrial arts objectives #1 represents "To develop consumer knowledge". . . etc.

[48]Code: S = strong possible contribution; M = moderate contribution possible; W = weak possible contribution. In each case, to arrive at the rating, the author subjectively answered the question: "To what extent could industrial arts (teachers, programs, typical approaches and activities, and facilities) be used to achieve, or contribute to the achievement of, the indicated objective of post-secondary/adult education?" For the purposes of this preliminary analysis, all post-secondary/adult education sub-objectives were collapsed and considered only in terms of major groups and no consideration was given to the varied contribution possibilities by post-secondary/adult education population.

Would not such experiences facilitate enrollees' subsequent contacts with and understandings of their fields' interfaces with adjacent technological areas?

Industrial Arts and Post-Secondary/Adult Education Recreational/Avocational Programs

In all likelihood, industrial arts facilities due to their versatility and typical comprehensiveness can provide a most useful base for post-secondary/adult education recreational progaams in the industrial crafts areas. Probably many of our facilities are already so employed. Beyond such hardware considerations, instructor breadth serves as an important advantage for utilizing industrial arts in this post-secondary realm of endeavor -- students will not be stifled by the narrow orientation of a single subject technical expert. Of course this is a two-edged sword in that industrial arts instructors selected for such roles must have the technical expertise to command the respect of a mature group of students that simply cannot be bluffed as easily as children.

Industrial Arts and Basic Post-Secondary/Adult Education

Probably this combination represents one of the least used possibilities identified by the matrix analysis. To the author this seems tragic in that its potential would appear to rank amongst the brightest of the contributions attributable to industrial arts. Particularly with some of the nontraditional populations, the motivation potential provided by interesting, technological and occupationally relevant activities would seem to be just what is needed to induce reluctant feet along the path to lifelong learning. Industrial arts traditionally has aspired to the goal of reinforcing the academic discipline and here is a prime possibility for the demonstration of such an approach. What better way to overcome apprehensions and groundless fears of inadequacy,

as they relate to basic competencies, than by diverting attention to a project? Then, subtle integration of basic functional competencies with the necessary production processes will yield the desired project or accomplish the task yearned for so long. Success is achieved!

Industrial Arts and Post-Secondary/Adult/Transfer/Liberal Arts/College Parallel Education

The study of technology and culture, of design, of man's gradual mastery over the environment--what could be more liberal arts in nature than that? The Ascent of Man and the Nova series demonstrated that technologically based treatments of scientific and humanity areas were both popular in approach and effective in impact. With the considerable potential of providing highly sophisticated technological laboratories in post-secondary/adult education institutions, particularly in technical institutes, a new possibility is introduced. No longer need such general academic courses--exploring the interface between technology and society--be relegated to the lecture/audio-visual technique. Instead dynamic experiments and dramatic confrontations with technological phenomena are possible. Students can feel the surge of power of a rocket engine on a test stand, they can sense the fantastic pressure of an isostatic powder-metallurgy press, they can marvel at the gradual emergence of latent images of X-ray test plates. They will be awed by the object that isn't there in holograms, and they will be stunned by the rapidity with which electronic computers spit out answers to mind-boggling problems! Yes, students indeed would have very different experiences . . .

SUMMARY

It was this author's intent to broach the subject of industrial arts' role in post-secondary/adult education and then to place it on the profession's floor for debate, discussion, and hopefully further development. Along this vein, note that this paper represents an unfinished piece. Not all of the cells provided by the matrices have been explored--that remains for you to do. Not all of the implications of the specific needs of the various nontraditional populations have been analyzed--that remains for you to do. Not all the relevant literature has been integrated into the rationale--that remains for you to do.

Some specific analyses have been provided and some techniques are suggested by the approaches as outlined. One useful outgrowth would be to conduct a systematic status study, according to the sample matrices, of current practice in the post-secondary/adult education realm--particularly as it relates to industrial arts. A second useful thrust would be to focus some more concentrated attention on the provisions for and articulation of a philosophically sound rationale. A third outgrowth would be the development of a concise position paper that could be used by our legislative committees as they work towards increased public understanding and legislative provisions for the role of industrial arts as we know it can be!

Well, the challenge is before us. Again we have the option of action or inaction, of progressing or atrophying, of the future or of the past. Which will it be?

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